



## Children's Knowledge Bank (set Of 4 Books)



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### Children's Knowledge Bank

Children often behave like young explorers who love to infiltrate into every territory unknown to them. Many a times, questions regarding various phenomena around them crop up in their minds. Sometimes they get their answers and sometimes their queries go unanswered.

Children's Knowledge Bank is an effort to answer all those questions which might arise in a child's mind. Segregated in four independent volumes further sub-divided into different units, the series touches upon various realms of knowledge such as General Knowledge, Human Body, Universe, and so on. Each book is supported by a team of experts, which makes the series truly a tonic to the child's brain.

#### AN EXCERPT FROM THE BOOK

##### Where was the potter's wheel invented?

The potter's wheel has always fascinated people. Many children have not seen a potter working. Do you know how these wheels were invented and where? In the beginning, the pots were shaped by hand out of wet clay. Turning the raw lumps of earth on a wheel was developed later.

The potter's wheel was invented in Sumeria, Babylon and also elsewhere in The Near East around 3000 BC. Clay pots had already been made for over 5000 years, but they were crude and broke easily.

Making pottery items on a potter's wheel is a craft that requires a lot of skill. The potter needs skill not only in spinning the wheel and shaping the pot with his hands, but also in firing the pot in a kiln to harden it. Potters also learned how to glaze (coat) pots with various substances to make the pots stronger and more decorative and beautiful.

The invention of the potter's wheel led to one of the first industries in the world - pottery. In earlier days, a skilful potter could make enough pots to exchange them for food and other goods, or sell them for money. Nowadays, potters make pots from clay to sell them in exchange for money. Pots now come in various shapes and sizes and patterns. Some examples of pottery have been recovered from the ruined cities of Pompeii and Herculaneum that were buried under volcanic ash when the volcano Vesuvius (near Naples, Italy) erupted in 79 AD. Examples of amphorae (big pottery jars) containing remnants of what was once wine, have been salvaged from ancient sunken ships discovered at the bottom of the Aegean Sea. Pottery shards and even some intact examples of pottery have been found at almost all archaeological sites the world over. This proves that knowledge of pottery extended to much of the ancient world.

##### How do spectacles help in clear vision?

We often come across people wearing spectacles. Wherever we go, it is possible to spot a person with spectacles within a moment. Anyone with weak eyesight uses spectacles. These days, there are spectacles available which help in viewing both near and far objects. Nowadays, lenses that fit externally over the cornea of the eyes are often used in place of spectacles. These are known as 'contact lenses'. These lenses can be of different colours and are used by those who do not want to wear spectacles, especially the youngsters.

The use of spectacles started over 700 years ago. In 1266, Roger Bacon of England used a piece of glass to magnify the words



written in a book. This glass piece was cut out of a spherical ball of glass. Salvino D'Armate of Italy is credited with inventing the first wearable eyeglasses, around 1284.

Cardinal Ugon's portrait made in 1352 shows him wearing spectacles. This proves that spectacles were developed during the period 1266-1352. By the 16th century, they had become very common. In 1784, Benjamin Franklin brought about a wonderful development in the field of spectacles by making bifocal lenses - a lens with two halves for both near and distant vision. You must be wondering how spectacles help us to see clearly.

Our eyes act like a camera. The light rays enter our eyes through cornea. There is a convex lens inside the eye, and behind this lens there is a light-sensitive screen, called the retina. The light rays coming from any object form an inverted image of the object on the retina with the help of this lens. This image is carried to the brain by the optic nerve. The brain converts these images as erect. This is how we are able to see an object correctly.

If the eyes have no defect, the focal length of this lens gets automatically adjusted and the image of the object always falls exactly on the retina. But sometimes, the eyes develop some defects due to which the image of the object is formed in front or behind the retina. Thus, the object appears blurred. Persons with such defects have to use spectacles. There are mainly three defects of vision that can be corrected by the use of suitable eyeglasses or spectacles.

**Myopia:** Persons suffering from this defect can see nearby objects clearly, but distant objects appear to be blurred. This defect causes the image of an object to form before the retina. This defect is corrected by using concave lenses in the spectacles, so that the image of a distant object is formed on the retina. Usually students suffer from this defect.

**Hypermetropia:** People suffering from this defect cannot see nearby objects clearly, but distant objects are clearly visible. Nearby objects make their images behind the retina. This defect is corrected by using convex lenses in the spectacles so that the image of the object is formed on the retina. This defect is common after the age of 50 years.

**Astigmatism:** In astigmatism, a person cannot focus simultaneously on both horizontal and vertical lines. This defect can be corrected by the use of cylindrical lenses.

Sometimes, due to old age, a person may suffer from both myopia and hypermetropia. This defect is known as presbyopia. Bifocal lenses, with both concave and convex lenses, are helpful for old people who are suffering from both these defects.

This is how spectacles can help people to see objects clearly. Spectacles have proved to be a great boon for persons with weak vision. In addition, sunglasses with UV filtering or cooling lenses are used for protecting the eyes from the intense rays of the Sun. Special glasses are used in UV sunglasses, which prevent the ultraviolet rays of the Sun from entering the eyes. Ultraviolet rays given out by the Sun are very injurious to the eyes, because they can damage the tissues due to their high energy content.

What is FM transmission?

Over the years Frequency Modulated (FM) transmission has attained wide popularity due to its clarity and high fidelity in reproducing the broadcast speech or music. It can also provide a stereophonic effect to the sound produced at the receiving end. Before television came into our homes, radio was a popular entertainment medium. With FM transmission capturing the imagination of people, radio is likely to become popular once again.

The earlier transmission services were basically Amplitude Modulated (AM), which could not filter the noise and hence lacked the clarity that FM can provide. But what is the fundamental difference between AM and FM transmission?

In both AM and FM transmission, radio waves are modulated by mounting it on the carrier frequency, which is essential for broadcasting and propagation. In AM transmission, the waves are constant in frequency but the amplitude varies, whereas in FM transmission, the amplitude is constant and the frequency varies. In simple terms, in AM, amplitude is modulated and in FM, the frequency is modulated.

Modulation is the process of coding the sound waves for transmission, and is done either by altering the amplitude of the wave or its frequency.

We now need to understand three fundamental concepts - modulating wave, carrier wave and modulated wave. The modulating wave is the information-bearing signal such as human voice or music, audible to the human ear, and intended to be communicated to a receiver. The carrier wave can be transmitted over long distances and is not audible to the human ear. The modulated wave is the wave derived by impressing the information-bearing signal on the carrier wave. This wave is transmitted through space to the receiver.

How is it that the FM transmission provides excellent reception?

Speech itself is represented by an irregular wave pattern. An FM receiver has to detect frequency changes only; it does not reproduce any amplitude changes caused by electrical interferences. As a result, almost all background noise can be eliminated using filters, producing excellent reception.

FM transmission is used in radio-broadcasting services, multi-channel carrier telephones, communication satellite links, telegraphy, mobile communications, navigational and meteorological equipments as well as for medical diagnostic instrumentation. FM also exhibits 'channel grabbing', that is, if two FM signals are available, the stronger of the two is received and the other is nearly excluded. This permits low-power radio stations operating in the same frequency to operate close to each other. AM transmission does not possess this ability.

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